

Claims

[c1] What is claimed is:

1. A space transformer comprising:

a body;

a ground conductor within said body;

a power conductor within said body, said power conductor adapted to be at a higher voltage level than a voltage level of said ground conductor;

one or more decoupling capacitors physically located within said body and electrically connected between said ground conductor and said power conductor.

[c2] 2. The space transformer of claim 1, further including:

one or more ground pins electrically connected to and extending from said ground conductor to a top surface of said space transformer;

one or more power pins electrically connected to and extending from said power conductor to said top surface of said space transformer; and

one or more signal wires or signal pins extending through said space transformer to said top surface of said space transformer.

[c3] 3. The space transformer of claim 2, further including:

an auxiliary power/ground board within said body;
one or more auxiliary power/ground pins electrically connected to and extending from said auxiliary power/ground board to said top surface of said space transformer; and
one or more of said decoupling capacitors electrically connected between said ground conductor and said auxiliary power/ground board.

[c4] 4. The space transformer of claim 2, wherein the length of an electrical path between said decoupling capacitors and said one or more ground pins and said one or more power pins at said top surface of said space transformer is between 5 to 25 millimeters.

[c5] 5. The space transformer of claim 2, wherein the length of an electrical path between tips of said one or more ground pins and said one or more power pins at said top surface of said space transformer and said ground conductor and said power conductor respectively is between 1 to 3 millimeters.

[c6] 6. The space transformer of claim 1, wherein said decoupling capacitors have an inductance between 175 pico Henries and 1 nano Henry.

[c7] 7. The space transformer of claim 1, wherein said de-

coupling capacitors have an inductance less than 60 pico Henries.

- [c8] 8. The space transformer of claim 1, wherein:
said ground conductor is separated from said power conductor by an insulator; and
said ground conductor, said insulator and said power conductor are stacked within said body of said space transformer.
- [c9] 9. The space transformer of claim 1, further including:
a signal board within said body; and
one or more signal pins electrically connected to and extending from said signal board to a top surface of said space transformer.
- [c10] 10. A wafer test apparatus comprising:
a probe card;
a space transformer mounted to a top surface of said probe card, said space transformer comprising:
a body;
a ground conductor within said body;
a power conductor within said body, said power conductor adapted to be at a higher voltage level than a voltage level of said ground conductor; and
one or more decoupling capacitors physically located within said body and electrically connected between

said ground conductor and said power conductor;
and
a probe mounted to said space transformer.

[c11] 11. The apparatus of claim 10, further including:
one or more ground pins electrically connected to and
extending from said ground conductor to a top surface
of said space transformer;
one or more power pins electrically connected to and ex-
tending from said power conductor to said top surface of
said space transformer;
one or more signal wires or signal pins extending
through said space transformer to said top surface of
said space transformer; and
said probe electrically contacting said one or more
ground pins, said one or more power pins and said one
or more signal wires or signal pins at said top surface of
said space transformer.

[c12] 12. The apparatus of claim 11 wherein said signal wires
are electrically connected to a bottom surface of said
probe card.

[c13] 13. The apparatus of claim 11, further including:
an auxiliary power/ground board within said body; and
one or more auxiliary power/ground pins electrically
connected to and extending from said auxiliary power/

ground board to said top surface of said space transformer.

[c14] 14. The apparatus of claim 11, wherein the length of an electrical path between said decoupling capacitors and said one or more ground pins and said one or more power pins at said top surface of said space transformer is between 5 to 25 millimeters.

[c15] 15. The apparatus of claim 11, wherein the length of an electrical path between tips of said one or more ground pins and said one or more power pins at said top surface of said space transformer and said ground conductor and said power conductor respectively is between 1 to 3 millimeters.

[c16] 16. The apparatus of claim 10, wherein said decoupling capacitors have an inductance between 175 pico Henries and 1 nano Henry.

[c17] 17. The apparatus of claim 10, wherein said decoupling capacitors have an inductance less than 60 pico Henries.

[c18] 18. The apparatus of claim 10, wherein:
said ground conductor is separated from said power conductor by an insulator; and
said ground conductor, said insulator and said power conductor are stacked within said body of said space

transformer.

- [c19] 19. The apparatus of claim 10, further including:
a signal board within said body; and
one or more signal pins electrically connected to and extending from said signal board to a top surface of said space transformer
- [c20] 20. The apparatus of claim 19, wherein said signal board is electrically connected to a top surface of said probe card.
- [c21] 21. The apparatus of claim 10, wherein said probe is a thin film interface probe, a cantilevered probe or a spring-loaded probe.